

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-14 (canceled)

Claim 15 (currently amended): A method for ~~producing~~ shifting a refined microstructure of a metallic material, comprising:

solidifying a molten metallic material at temperatures lower than a liquidus of the molten metallic material; [[and]]

applying an electric current and a magnetic field simultaneously to the solidifying metallic material to crush solid crystal particles of the solidifying metallic material into small pieces; and ~~such that~~

shifting the small pieces are shifted to a periphery of a cylindrical tube or container by alternating a magnetic field using an electromagnetic coil disposed such that the electromagnetic coil envelops the metallic material to yield said refined microstructure of the metallic material concentrated in the periphery of the cylindrical tube or container, ~~wherein said cylindrical tube or container is disposed such that an axial direction thereof is orthogonal to the magnetic field.~~

Claims 16-17 (canceled)

Claim 18 (previously presented): The method of Claim 15, wherein the applying further comprises applying the electric current and the magnetic field during last stages of solidifying of the solidifying metallic material.

Claim 19 (canceled)

Claim 20 (new): The method of Claim 15, wherein the shifting comprises alternating a stationary magnetic field using the electromagnetic coil disposed such that the electromagnetic coil envelops the metallic material.

Claim 21 (new): The method of Claim 15, wherein the shifting comprises shifting the small pieces to an end portion of the metallic material in the cylindrical tube or container.